

## A SECOND WESTERN ATLANTIC RISSOELLA AND A LIST OF THE SPECIES IN THE RISSOELLIDAE

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The taxonomy of West Indian marine mollusks has been studied for many years and much has been published on this subject. Nevertheless, the minute species in the shallow water West Indian fauna are far less known than the larger species, and unnamed minute species are still encountered not infrequently. One of the purposes of this paper is to draw attention to this fact in the hope that those who collect mollusks in the tropical Western Atlantic will henceforth devote special attention to minute species. A method of collecting minute mollusks alive is described elsewhere (Robertson, in press). Minute species collected alive are much more useful for study than those obtained from sand or beach drift, the shells of which generally are worn or broken.

The first western Atlantic species in the family Rissoellidae was described by Rehder in 1943. *Rissoella caribaea* was collected by Dr. Blenn R. Bales in the Florida Keys. Records published in the present paper extend the known range of this species to Puerto Rico. The shell is refigured and illustrations are presented for the first time of its operculum and radula. In addition, the variation and habitats of *R. caribaea* are discussed. I have collected a tiny, second species of *Rissoella* in the Bahama Islands; this species is described and named *R. galba* in this paper.

All the species in the genus *Rissoella* are minute. The shell of *R. caribaea* attains 1.7 (.07 in.) in length; that of *R. galba* (the smallest known species in the genus) is only 0.7 mm. in length. The shell of *Rissoella* is glass-like: fragile and partially or almost wholly transparent. Probably because of their fragility, *Rissoella* shells are rare in beach drift and no fossil species in the Rissoellidae have been reported. Old, empty *Rissoella* shells are opaque, white, and readily crumble to pieces. Most species of *Rissoella* live among algae.

A live *Rissoella* is distinctive because there is a pair of tentacle-like processes anterior and median to the true tentacles. The animal thus appears to have four tentacles and is unique among

prosobranchs in this respect. (The anterior processes are either the lobes of a bifid snout—'labial palps'—or the anterior lobes of bifid tentacles.) The body is clearly visible through the shell and in some species there are characteristic spots or patterns on the mantle.

The anatomy and life history of two British species of *Rissoella* have been studied by Fretter (1948). They both are annual, and few adults survive the winter. Both species are simultaneous hermaphrodites and neither has a pelagic larval stage (see also Lebour, 1936). Neither species has a functional gill (ctenidium). One of the species feeds on diatoms, small algal filaments and detritus but both species lack a crystalline style.

The biological peculiarities of the two British species of *Rissoella* were originally attributed by Fretter to their small size. Later, however, Fretter & Graham (1954) have considered *Rissoella* to be an opisthobranch rather than a prosobranch. Later still (1956), Fretter appears to have had doubts and has again referred to *Rissoella* as a prosobranch. *Rissoella* has invariably been placed among the prosobranchs by all other malacologists (but see Clark, 1855, and Lebour, 1936). Thiele (1929) tentatively placed the Rissoellidae in the prosobranch "Stirps" (superfamily) Rissoacea between the "Trachysmatidae" (Trachysmidae) and the Choristidae, two families the relationships of which are also in doubt.

A *Rissoella* operculum is corneous and translucent. It conforms to the shape of the aperture of the shell and has a peg, which, when the body is withdrawing into the shell, acts as a pivot against the columella as well as a point of insertion of muscles. There is a buttress supporting the peg on the inner surface which in some species supposedly extends as a ridge nearly as far as the outer edge of the operculum. There is also another ridge on the inner surface which parallels the columella edge of the operculum. The peg projects from this ridge. (The peg is apparently absent in *Heterorissoa*.) The published figures of the operculum of *R. diaphana* (Alder), the type species of *Rissoella*, are inaccurate. The operculum of *R. caribaea* (pl. 9, figs. 3-5) closely resembles that of *R. diaphana*.

Thiele studied the radulae of 7 species of *Rissoella*. He discovered that there are remarkable differences between the radulae

of several species, despite the close similarity of their shells and opercula. Accordingly, he divided the genus into 5 genera and subgenera, primarily on the basis of radula characters. Later (1929), Thiele ranked these as 4 subgenera.

The radula of *R. caribaea* (pl. 9, fig. 6), the type species of the subgenus *Phycodrosus* Rehder (1943a), resembles that of *R. zebra* Thiele, the type species of the subgenus *Jeffreysilla* Thiele (1925). The radulae of both species have broad central teeth which are medially indented on the posterior margin. The laterals of both species are fairly large and the marginals are rod-like. The radula of *R. caribaea* apparently differs from that of *R. zebra* in having narrow, untoothed cusps on the central teeth. The differences between the shells of *R. zebra* (from East Africa) and *R. caribaea* are minor. In view of these similarities, *Phycodrosus* is here synonymized with *Jeffreysilla*.

There are 7 nomenclaturally valid generic and subgeneric names in the family Rissoellidae. *Jeffreysiella* and *Jeffreysilla* were originally distinguished from *Rissoella*, s.s. (and *Jeffreysiopsis*), solely on the basis of radula and jaw characters. *Jeffreysina* was distinguished by radula characters and the outline of the shell, *Phycodrosus* by minor shell characters, and *Heterorissoa* solely by a supposed difference of the operculum. *Heterorissoa* is probably indistinguishable from *Jeffreysiella*, and *Phycodrosus* from *Jeffreysilla*. I recognize only the genus *Rissoella* in the family at this time, believing that the 4 supposedly distinct subgenera very well may not be natural groups.

The distribution of the species of *Rissoella* so far described is peculiar. Excluding species which may not belong in the genus, 3 species are known from Europe, 1 from St. Helena, 3 (?) from South Africa, 1 from East Africa, 4 from islands in the S. Indian Ocean, 1 from Australia, 1 from the Kermadec Islands, 7 (?) from the Eastern Pacific, and 2 from the Western Atlantic. Undoubtedly, species in the genus remain to be discovered in these and other regions. Nevertheless, the occurrence of 6 of the 23 known species at isolated islands in the Southern Hemisphere is noteworthy.

I prefer to use the names *Rissoella* and Rissoellidae rather than *Jeffreysia* and Jeffreysiidae for the reasons given by Iredale (1915) and Bartsch (1920).

*Acknowledgments.* Most of the Bahamian specimens for this study were collected during 2 visits to the Lerner Marine Laboratory, Bimini. I am indebted to the Laboratory for these opportunities and to Mrs. Germaine L. Warmke, who obtained all the Puerto Rican specimens.

Family RISSOELLIDAE Gray (1850)

[“Heterophrosynidae” Clark (1855), in part; “Jeffreysiadae” Carpenter (1856) ]

Genus *Rissoella* Gray (1847)

RISSOELLA CARIBAEA Rehder (1943a). Plate 9, figs. 2-7.

The shells of most Bahamian specimens are slightly wider and more inflated than those of topotypes which I have examined (U.S.N.M. 537900; A.N.S.P. 179254, 221931; M.C.Z. 124167, etc.). There is much variation, however, and a few Bahamian shells are narrower than the topotypes.

When this species is alive it can be recognized by the four ‘tentacles’ and the black body which is clearly visible through the semi-transparent shell. In the Bahama Islands the body is black with a cream-colored pattern on the mantle inside the abapertural side of the last whorl (pl. 9, fig. 7). Curiously, most of the Floridian specimens and all the Puerto Rican specimens lack this cream-colored pattern; the bodies are uniformly black. At the type locality in the Florida Keys, *R. caribaea* has been reported to have “white tentacles contrasting strongly with the black body . . .” (Rehder, 1943b). Bahamian specimens have dark gray tentacles and anterior processes.

In the Bahama Islands this species lives intertidally among the red alga *Bostrychia* (“*Amphibia*”) on mangrove prop roots and pneumatophores (see Robertson, 1960). The Puerto Rican specimens were obtained alive by Mrs. Germaine L. Warmke from green algae (*Caulerpa*, *Bryopsis*, *Cladophoropsis*), a brown alga (*Dictyota*), and from red algae (*Laurencia*, *Galaxaura*, *Acanthophora*). She also obtained 3 living ones from algae (probably *Bostrychia*) on mangrove roots. All but one specimen which I collected in the Florida Keys were in *Bostrychia* on mangrove roots. (The one specimen, from Knight Key, was living in the green alga *Cladophora*.) At the type locality in the Florida Keys, *R. caribaea* was found in a different habitat: “in sparsely populated colonies on the clean rocks . . .” in “an artificial fill . . . in

clean water, free from marl." (Rehder, 1943b).

I interpret the shell and body color differences as attributes of a variable species which has developed minor local forms and which has different habitat tolerances in different areas. The shape and color differences could be due to the habitat differences and to the effects of isolation. (The species possibly lacks a pelagic larval stage.) Body color variation in another species of *Rissoella* is discussed by Fretter (1948).

This species was first reported from the Bahama Islands by McGinty (1948, mimeogr.), who collected it at South Cat Cay (near Bimini), Pigeon Cays (Andros), 4-6 fathoms off Nassau Harbour (alive) and at Clifton Point (both New Providence).

*New locality records:* *Florida Keys:* Cudjoe Bay, Cudjoe Key; nr. north end Big Pine Key; Fla. Bay side Little Duck Key; Fla. Bay side Knight Key; Fla. Bay side west end Lower Matecumbe Key (all collected by author, A.N.S.P.); Missouri Key (Bales, M.C.Z.; McGinty). *Florida:* Venetian Causeway, on rocks (McGinty). *Bahama Islands:* Bimini (numerous localities, M.C.Z., A.N.S.P., etc.); west end Hog Cay, Exuma Cays (A.N.S.P. & U.S.N.M.). *Puerto Rico (Western):* Pta. Arenas, near Mayagüez, and Bahía Fosforescente and Cayo Enrique, both near La Parguera (all Warmke, A.N.S.P.).

*RISSOELLA GALBA*, new species.

Plate 9, fig. 1.

*Description.* Shell minute, ovate, umbilicate, thin, semi-transparent; whorls  $3\frac{1}{2}$ , evenly rounded, inflated; fine axial growth lines on the otherwise smooth and shiny surface; an opaque white spiral band extending (in adults) around the umbilical region on the apertural side of the shell; sutures slightly impressed; aperture pyriform-ovate; outer lip thin; callus on columella in adults; umbilicus fairly narrow but adjacent shelf wide; columellar callus raised to form a ridge next to the umbilical shelf. Operculum apparently similar to that of *R. caribaea*. Whole body of animal pale yellow (changing to pale yellowish green in alcohol) except for black eyes and pale brown digestive gland and gonad. Anterior margin of foot slightly bilobed; pair of processes anterior and median to tentacles.

<i>Measurements.</i>	length	width	(all $\pm 0.02$ mm.)
(large)	0.68	0.56	Hog Cay, Exuma Cays
	0.66	0.52	Holotype
(young)	0.39	0.37	Cavelle Pond, S. Bimini

*Specimens examined.* Holotype (M.C.Z. 221105) and 2 paratypes (M.C.Z. 221106) from turf of filamentous green algae (*Cladophora?*) on rocks at low tide mark, northwest end of South Bimini, Bahama Islands. Other paratypes from the red alga



*Bostrychia* on mangrove roots, Tokas Cay (A.M.N.H. 84892) and Cavelle Pond, South Bimini (A.N.S.P. 252671 & U.S.N.M. 613497) [0.6 and 1.1 miles from type locality, respectively]. Additional specimens from algae on mangrove roots at west end Hog Cay, Exuma Cays, and sand from Green Turtle Cay, Great Abaco, both Bahama Islands (both A.N.S.P.). All specimens collected by the author. Pigeon Cays, Andros, Bahama Islands, with *R. caribaea* in algae (McGinty).

*Remarks.* This species differs from *R. caribaea* in having a smaller shell (less than half the length of *R. caribaea* when full-grown) with a slightly different outline. There is a white band on the shell which is not present in *R. caribaea* and the umbilical shelf is wider and shorter. The predominant color of the body of the two species also differs consistently; that of *R. caribaea* is black, while that of *R. galba* is pale yellow. Juveniles of *R. caribaea* much smaller than any of the specimens of *R. galba* were seen to have black bodies.

*R. galba* does not closely resemble any of the Eastern Pacific species so far described (Bartsch, 1920, 1927; Baker, Hanna & Strong, 1930; Strong, 1938; Smith & Gordon, 1948). Its small size and white band on the shell distinguish it from all other described species of *Rissoella*. The four 'tentacles' were seen, so *R. galba* is definitely a *Rissoella*. It is not juvenile because there are  $3\frac{1}{2}$  whorls; most species of *Rissoella* have 3-4 whorls.

As stated above, *R. galba* was found in the same habitat as that in which *R. caribaea* apparently invariably lives in the Bahama Islands, namely in *Bostrychia* on mangrove roots. Three specimens of *R. galba* were also found in filamentous green algae. *R. caribaea* is much more abundant at Bimini and Exuma (Bahamas) than *R. galba*: only 12 specimens of *R. galba* were collected while hundreds of *R. caribaea* were obtained.

*Derivation of name.* Latin, galbus, yellow (referring to the predominant color of the body).

(To be continued)

## **COLUBRARIIDAE (GASTROPODA) OF TROPICAL WEST AMERICA, WITH A NEW SPECIES**

BY G. BRUCE CAMPBELL

In August, 1960, the 105-foot shrimp trawler, "Ariel," dredged 6 days off Cabo Haro, Mexico, and southeastern Baja-Lower Calif.